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OCEAN CITY HARBOR AND INLET AND SINEPUXENT BAY, MD.

LETTER

FROM

THE SECRETARY OF THE ARMY

TRANSMITTING

A LETTER FROM THE CHIEF OF ENGINEERS, UNITED STATES ARMY, DATED DECEMBER 27, 1950, SUBMITTING A REPORT, TOGETHER WITH ACCOMPANYING PAPERS AND ILLUSTRATIONS, ON A PRELIMINARY EXAMINATION AND SURVEY OF OCEAN CITY HARBOR AND INLET, AND SINEPUXENT BAY, MD., AUTHORIZED BY THE RIVER AND HARBOR ACT APPROVED ON MARCH 2, 1945

APRIL 24, 1952.—Referred to the Committee on Public Works and ordered to be printed, with two illustrations

LETTER OF TRANSMITTAL

DEPARTMENT OF THE ARMY,
Washington 25, D. C., April 17, 1952.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

DEAR MR. SPEAKER: I am transmitting herewith a report dated December 27, 1950, from the Chief of Engineers, United States Army, together with accompanying papers and illustrations, on a preliminary examination and survey of Ocean City Harbor and Inlet, and Sinepuxent Bay, Md., authorized by the River and Harbor Act approved on March 2, 1945.

In accordance with section 1 of Public Law 14, Seventy-ninth Congress, the views of the State of Maryland are set forth in the enclosed communications.

The Bureau of the Budget makes certain comments and advises that, on the basis of the information available to them, the proposed additional improvements should be considered of low priority at this time and in the event of the authorization of the modification a com-

plete reevaluation of benefits and costs in the light of the above should be made before funds are requested for initiation of construction in order to assure that the Federal expenditures requested are justified.

Although the Bureau of the Budget advises that there is no objection to the submission of the report to Congress, it states that any estimate of appropriation for the initiation of this project, if authorized by Congress, must be justified in accordance with the policy set forth in the President's letter to the Secretary of the Army dated July 21, 1950, concerning curtailment of civil public works or any modification thereof. The complete views of the Bureau of the Budget are contained in the attached copy of its letter.

Sincerely yours,

FRANK PACE, Jr.,
Secretary of the Army.

COMMENTS OF THE BUREAU OF THE BUDGET

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington 25, D. C., March 31, 1952.

The honorable the SECRETARY OF THE ARMY.

(Through the Budget Officer for the Department of the Army.)

MY DEAR MR. SECRETARY: Receipt is acknowledged of your letter dated January 17, 1951, submitting the proposed report of the Chief of Engineers on a preliminary examination and survey of Ocean City Harbor and Inlet, and Sinepuxent Bay, Md., authorized by the River and Harbor Act approved March 2, 1945.

The Chief of Engineers recommends that the existing project be modified by raising the north jetty to an elevation of 9 feet above mean low water, and by providing a channel 16 feet deep and 300 feet wide from the ocean through the inlet to the Isle of Wight Bay channel, thence 200 feet wide to the project harbor, and a depth of 14 feet in the project harbor. The estimated cost of this improvement is $660,000 including $2,000 for aids to navigation to be furnished by the United States Coast Guard. The benefit-cost ratio is estimated to be 1.22 on the basis of annual benefits estimated at $50,600 and annual charges of $41,600.

In estimating the annual benefits, the district engineer assumes that due to the proposed improvements in the harbor, Ocean City will attract 10 fishing trawlers from northern ports and 10 others from ports south of this harbor. Based on a seasonal catch of 200,000 pounds per boat and a saving of three-quarters of a cent per pound in transportation costs to northern markets, it is estimated that the boats from southern ports would realize monetary benefits totaling $15,000. In the case of the boats from northern ports, it is assumed that the reduction in running time from fishing grounds to market would increase the fishing time by 10 percent and increase the total catch per boat by 20,000 pounds per season. At 7 cents per pound the increased catch would raise the value of the Nation's annual food supply by $14,000. Since the anticipated savings from southern

fishermen are dependent upon abandonment of the present base of operations during certain months of the year, their full realization would appear to be questionable. Similarly, the anticipated savings to northern fishermen probably will be partially offset in many instances by increases in transportation costs over those incurred under present operating procedures.

Included in the estimated annual benefits is an amount of $21,600 based on the assumption that construction of the proposed improvements would result in the construction of an oil and gasoline terminal at Ocean City and that distribution of petroleum products to a large section of the Delmarva Peninsula would be shifted from Salisbury at a saving in transportation costs of about one-half cent per gallon. This assumption seems rather conjectural and unless the half-cent saving is passed on to consumers the propriety of considering this item an economic benefit is not clearly established. On the other hand, if this saving is passed on to the consumer there seems little incentive for any distributor to shift his operations from Salisbury to Ocean City.

If the estimate of benefits were revised to reflect the above considerations, the economic justification of the proposed modification might be considerably reduced, particularly since 40 percent of the benefits represent estimated savings due to the possible shifting of a petroleum terminal from Salisbury to Ocean City. However, it would appear in this case only proper to consider the comprehensive improvement including the work already done at this locality together with some recognition of the substantial contribution of $500,000 made by local interests toward the cost of the existing project. While, therefore, the modification recommended at this time might be marginal, its consideration as an improvement to the existing facilities should not be precluded. Accordingly, I am authorized by the Director of the Bureau of the Budget to advise you that, while there would be no objection to the submission of the report to Congress, on the basis of the information available to us the proposed additional improvements should be considered of low priority at this time and in the event of the authorization of the modification a complete reevaluation of benefits and costs in the light of the above should be made before funds are requested for initiation of construction in order to assure that the Federal expenditures requested are justified.

The President in his letter to you dated July 21, 1950, directed that all civil public works be considered with the objective, as far as practical, of deferring, curtailing, or slowing down those projects which do not contribute to defense or to civilian requirements essential in the changed international situation. Therefore, any estimate of appropriation for the initiation of this project, if authorized by the Congress, must be justified in accordance with the policy set forth in the President's letter referred to above or any modification thereof.

Sincerely yours,

WM. F. MCCANDLESS,
Assistant Director for Estimates.

COMMENTS OF THE STATE OF MARYLAND

STATE OF MARYLAND,
BOARD OF NATURAL RESOURCES,
DEPARTMENT OF GEOLOGY, MINES, AND WATER RESOURCES,
Baltimore 18, Md., August 21, 1950.

Ocean City Harbor and Inlet.

Gen. LEWIS A. PICK,
Chief of Engineers, Department of the Army,
Washington, D. C.

DEAR GENERAL PICK: I have your letter of August 11, ENGWD, transmitting the proposed report on improvements of Ocean City Harbor and Inlet.

The essential features of the recommended improvements are raising the north jetty to a height of 9 feet to prevent spilling over and around that jetty southward drifting sand and to serve as a breakwater to protect boats in passing through the inlet and widening and deepening the channel to provide safe passage through the inlet.

The channel improvements recommended are to increase the size of the channel through the inlet from 200 feet wide and 10 feet deep to 300 feet wide and 16 feet deep, to increase the size of the 3,000 feet of channel from the inlet to the project harbor from 100 feet wide and 10 feet deep to 200 feet wide and 16 feet deep, and to increase the depth of the project harbor from 10 to 14 feet.

These recommendations are in accordance with the improvements requested by the local interests except that they requested 16 feet in the project harbor and requested a bulkhead about 600 feet long between the west end of the north jetty and the bulkhead at the United States Coast Guard property to afford protection against shore erosion.

A 16-foot channel in the inlet does not require more than 14 feet in the harbor. I understand the local interests acquiesce in this recommendation.

The bulkhead is not recommended on the grounds that it is not a navigation improvement and that as a part of the water front of Ocean City, it is an improvement that is incumbent upon the city to provide. The adverse decision on this request is in accordance with established practice and has not been protested by the local interests.

The recommendations in the proposed report provide, therefore, a mutually satisfactory solution to the existing navigation difficulties and dangers in the inlet and the harbor at Ocean City.

A review of the request for a channel across Sinepuxent Bay from South Point to near the North Beach Coast Guard Station on Assateague Island is not included as the project is apart from the Ocean City project and the Maryland Board of Natural Resources has had under consideration possible public uses of Assateague Island which may alter the situation with respect to that request. A review of that request will be transmitted as promptly as possible and in any event prior to November 15.

Sincerely yours,

JOSEPH T. SINGEWALD, Jr., *Director.*

COMMENTS OF THE STATE OF MARYLAND

STATE OF MARYLAND,
BOARD OF NATURAL RESOURCES,
DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES,
Baltimore 18, Md., September 23, 1950.

Channel Across Sinepuxent Bay, South Point to North Beach Coast Guard Station.

Gen. LEWIS A. PICK,
Chief of Engineers, Department of the Army,
Washington, D. C.

DEAR GENERAL PICK: In my letter of August 21, 1950, on Ocean City Harbor and Inlet commenting on the report transmitted with your letter of August 11, ENGWD, I deferred comment on this portion of the report pending discussion of it by the Maryland Board of Natural Resources.

The Maryland Board of Natural Resources has had under consideration recently recommending that the Maryland portion of Assateague Island be made a wildlife refuge as in the Virginia portion and that the ocean beach be made available for public recreational use. In such case the State of Maryland would have a greatly augmented interest in adequate navigation facilities between the mainland and the island, and the general benefits of such facilities would be greatly enhanced and greatly widened in scope.

Soon after this was taken under consideration by the board, a development company, called the Ocean Beach Corp., acquired much of the Maryland portion of the island and began planning the development of a seaside colony. This raised some doubt as to the practicability of the plans under consideration by the board of natural resources, so that the extent of the State's interest now and in the future in this portion of the Ocean City project became uncertain.

At present the immediate beneficiaries of improved navigation facilities from the mainland to Assateague Island would be the Ocean Beach Co., and those to whom it sells lots, the private ferry company operating in the existing channel, and Worcester County through the increased land values on Assateague Island resulting from the real-estate development, all of whom fall into the category of local interests.

The situation is that in 1947, the existing channel, which is 2 miles long, 50 feet wide, and 4 feet deep, was dredged at a cost of $11,500, for which Worcester County paid $10,500 and others subscribed $1,000. There has been no provision for maintenance of the channel and no adequate navigation aids have been provided to mark the channel. The County Commissioners of Worcester County have requested the Corps of Engineers to assume the maintenance of the channel.

The district engineer finds that to use the Federal equipment the channel would have to be widened to 60 feet, and to lessen the frequency of maintenance work he recommends the depth be increased to 4.7 feet. The estimated cost is $56,000 and the average annual maintenance cost is estimated at $1,800. Navigation aids would entail an additional cost of $5,600. The project was recommended by the district engineer and concurred in by the division engineer. These recommendations were overruled by the Chief of Engineers and by the Board of Engineers on the grounds that the general benefits are

not adequate and that the benefits are mainly local in character and such as should be provided by the local interests.

The local interests, including the county commissioners, were advised of the adverse decision and were invited to support further their proposal, but did not respond.

Without prejudice to any future interest in the improvement of navigation facilities to Assateague Island that may develop on the part of the State of Maryland, the board of natural resources for the present accepts the adverse decision of the Board of Engineers for the following reasons:

(1) The failure of the local interests to show diligence in the support of their request.

(2) One of the principal local beneficiaries has not yet decided between a channel and a bridge.

(3) It is not now clear what the future status of the island will be with respect to public use.

(4) The financial benefits that have recently accrued to the local interests are adequate to require their assumption of the moderate maintenance cost of the existing channel at least until such time as public access to and use of the island has been clarified.

Sincerely yours,

JOSEPH T. SINGEWALD, Jr., *Director.*

REPORT OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY

DEPARTMENT OF THE ARMY,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington 25, D. C., December 27, 1950.

Subject: Ocean City Harbor and Inlet, and Sinepuxent Bay, Md.
To: The Secretary of the Army.

1. I submit for transmission to Congress my report with accompanying papers on preliminary examination and survey of Ocean City Harbor and Inlet, and Sinepuxent Bay, Md., authorized by the River and Harbor Act approved March 2, 1945.

2. Ocean City, Md., is on a narrow barrier beach which lies between Sinepuxent Bay and the Atlantic Ocean, 105 miles north of the Virginia Capes. Sinepuxent Bay, which is from 0.5 to 1.5 miles wide, extends from Isle of Wight Bay on the north to Chincoteague Bay on the south, a distance of about 11 miles. On a number of occasions, storms have opened temporary inlets from the ocean to Sinepuxent Bay. Such an inlet was opened at the south end of the Ocean City Boardwalk by a severe storm in August 1933. The improvement of this opening, which separates Ocean City from Assateague Island, a barrier beach extending 35 miles southward to Chincoteague, Va., is a part of the existing Federal project. This project provides for construction of an inlet 10 feet deep and 200 feet wide, protected by jetties; a channel 10 feet deep, 100 feet wide, and 3,000 feet long from the inlet channel into the marsh area to form a harbor south of the railroad on the west side of Sinepuxent Bay, with two turning basins of the same depth; a channel 6 feet deep and 150 feet wide in Sinepuxent Bay from the inlet to Green Point, thence 100 feet wide into Chincoteague Bay; and a channel 6 feet deep and 125 feet wide from

the inlet channel to a point opposite North Eighth Street in Ocean City, thence 75 feet wide into Isle of Wight Bay. Jetties were constructed on the north and south sides of the channel. The offshore end of the north jetty, which was constructed only slightly above mean high water, has settled and become flattened so that its outer end is now submerged. Maintenance dredging has been performed and project depths are available except in the Sinepuxent Bay Channel and in that part of the Isle of Wight Bay Channel north of Ninth Street in Ocean City. Assateague Island Channel, which is not a part of the existing Federal project, extends from South Point, near the lower end of Sinepuxent Bay, to Assateague Island in the vicinity of the North Beach Coast Guard Station. This channel, 50 feet wide and 4 feet deep at local mean low water, was constructed by local interests in 1947 at a cost of about $11,500, but it has not been maintained. The mean range of ocean tide at Ocean City is 3.4 feet. In Isle of Wight and Sinepuxent Bays, the mean range of tide varies from about 2.5 feet at the inlet to 0.3 foot at their heads. Federal costs under the existing project to June 30, 1948, were $350,193 for new work and $506,307 for maintenance. In addition, $500,000 was expended for new work from funds contributed by the State of Maryland. The approved estimate for annual cost of maintenance is $32,000.

3. Ocean City is a summer resort with a transient population of more than 10,000. It had a permanent population of 1,050 in 1940. It is served by improved roads and a railroad, which terminates on the west side of the bay opposite the city proper. The town of Berlin, with a population of 1,435 in 1940, is 7 miles inland from Ocean City. It is a small industrial center and a distribution point for commodities produced and used on the eastern side of the Delmarva Peninsula. The country adjacent to Ocean City and Berlin is principally agricultural. On the Sinepuxent Bay side of Ocean City there are two storage basins for recreational and small commercial craft and numerous privately owned pile and timber piers and bulkhead wharves. The commercial fish harbor has a public bulkhead landing about 1,000 feet long, several private bulkhead wharves open to the public for transaction of business with the owners, and a boat-repair yard with a marine railway capable of handling boats up to about 150 tons. A spur line of the railroad, parallel to and about 200 feet from the commercial harbor, serves the harbor; and all the piers and wharves are accessible by highway. Adequate space is available for expansion of facilities as required. Commerce reported for the year 1947 consisted of 2,203 tons of fish, 483 tons of oysters, and 43 tons of clams, transported in vessels having loaded drafts up to 8 feet. Traffic through the inlet is presently composed almost entirely of local commercial fishing vessels, charter and open-party fishing vessels, and recreational craft. Terminal facilities for the channel across Sinepuxent Bay to Assateague Island consist of a county-owned timber bulkhead at both termini of the channel. Commerce has consisted of automobiles and passengers transported by a privately owned ferry; an unknown quantity of crabs and clams caught by small commercial seafood boats; provisions and supplies for maintenance of the North Beach Coast Guard Station; and equipment of Navy personnel engaged in training exercises on Assateague Island. In addition to trips made by the

ferry, daily trips are made by Coast Guard craft. Thirty-eight recreational and small seafood craft are reported to be using the channel.

4. Local interests request improvement of the existing channel in the inlet and harbor to provide a depth of 16 feet and a width of 300 feet through the inlet and a depth of 16 feet in the harbor, with well-lighted protecting jetties high enough to prevent sand and seas sweeping over them. They also request construction of a bulkhead along the bay shore from the west end of the present bulkhead on the north side of the inlet northward to connect with the bulkhead at the United States Coast Guard property at Ocean City for the purpose of arresting shore erosion. They state that the present inlet channel is very dangerous to navigate, particularly during periods of strong winds; that boatmen entering the inlet at such times risk the loss of or damage to their boats by being blown on the rocks of the south jetty; and that raising the north jetty would greatly alleviate this condition. They claim that a channel of present project dimensions will not accommodate all vessels desiring to use the harbor, and that lack of ports between Cape May, N. J., and Norfolk, Va., is a serious handicap to coastal navigation and fishing. They estimate that provision of an adequate harbor at Ocean City would result in benefits to the fishing industry of $624,000 annually by reason of increased fishing time and premium payments for fresher fish due to the use of a nearer market; and that about 4,000,000 gallons of petroleum products now received each year at Salisbury, Md., could be distributed from Ocean City at a saving of about one-half cent per gallon, or about $20,000 annually. They state that an adequate port at Ocean City would permit recreational craft traveling from Cape May to Norfolk to use the Atlantic Ocean route at a saving in sailing time of one day and would result in other important benefits by providing a convenient harbor of refuge. Local interests further request that the channel across Sinepuxent Bay to Assateague Island be properly marked and maintained as a part of the Federal project, claiming that they are not financially able to do so, and that benefits to the general public from the increasing use of Assateague Island as a recreational area are such as to warrant Federal maintenance. They offer to furnish free of cost to the United States all rights-of-way and spoil-disposal areas necessary for modification of the existing project at Ocean City and for maintenance of the Assateague Island channel.

5. The district engineer finds that improvement of navigation conditions in Ocean City inlet and provision of adequate depths through the inlet to and in the harbor would afford many advantages to the commercial fishing boats operating off Ocean City, especially during the winter season when fish are usually found in greater abundance off Ocean City than off other points along the Middle Atlantic coast. Dangerous navigation conditions in the inlet have resulted in the loss of two lives and of two fishing craft valued at $12,500. During storm periods an improved harbor would provide a convenient refuge for both recreational craft and commercial fishing vessels. With a view to providing the facilities required for these craft, the district engineer has considered a plan to rebuild and raise the north jetty throughout its length to a top elevation of 9 feet above mean low water, with a top width of 20 feet; to provide a channel 300 feet wide and 16 feet deep through the inlet to the channel leading to Isle of Wight Bay,

thence 200 feet wide and 16 feet deep to the project harbor; and to provide a depth of 14 feet in the project harbor. He considers that the bulkhead construction desired by local interests, while it would arrest shore-line erosion, is not in the interest of navigation and should properly be undertaken as a local rather than a Federal improvement. He states that rebuilding and raising the north jetty will provide a reasonably permanent structure acting both as a breakwater for protection of vessels navigating the inlet and as an impounding area to retain littoral drift now passing around and over the jetty into the inlet and inner bays. He considers the present channel through the inlet too narrow to permit safe navigation by the larger craft; that widening the channel to 300 feet would permit safe navigation of the necessarily curved channel against swift tidal currents and frequent strong northeasterly winds; and that a depth of 16 feet would be sufficient for vessels with drafts up to 12 feet under all except extreme conditions of wind and tide. His studies indicate that the proposed work on the north jetty would have a generally beneficial effect on the shore line north of the inlet and little, if any, on the shore line south of the inlet; and that the channel deepening and widening would have no effect on the ocean shore line. However, he contemplates depositing spoil from dredging operations in the inlet on the beach immediately to the south. He finds that the difficulties encountered in using the channel across Sinepuxent Bay to Assateague Island result mainly from lack of navigation aids, but if maintenance is not provided lack of navigable depth in portions of the channel will become a greater difficulty. To provide adequate means of access to the island, he has considered a plan providing a channel 60 feet wide and 3 feet deep at project datum, equivalent to 4.7 feet deep at local mean low water, extending from South Point across Sinepuxent Bay to the barrier beach in vicinity of the North Beach Coast Guard Station, with a turning basin at each end. He finds that the present channel dimensions are insufficient for the operation of normally available dredging plant and for reasons of economical maintenance the larger channel should be provided. The district engineer estimates the first cost of the proposed improvement for Ocean City Harbor and Inlet at $660,000, including $2,000 for aids to navigation; and the cost of enlarging the channel from South Point across Sinepuxent Bay at $56,000, including $6,000 for aids to navigation. He estimates the annual carrying charges for improvement of the harbor and inlet at $41,600, including $16,000 for annual maintenance in addition to the present requirement; and for the channel across Sinepuxent Bay, at $4,000, including $1,800 for annual maintenance. All costs would be Federal. While discounting in large measure the claims of benefits by local interests, the district engineer considers that the proposed improvements, if made, would permit southern fishermen to market fish, caught during the winter months, at Ocean City at a saving in transportation cost of $15,000 annually; that by reducing the running time of the northern fishermen from fishing grounds to market and thus increasing fishing time, the yield in increased catch would have a value of $14,000 annually; and that savings in the transportation cost of petroleum products would amount to about $21,600 annually; a total of $50,600. The benefit-cost ratio for the proposed improvements at Ocean City is 1.22. He considers that the channel across Sinepuxent Bay would provide a dependable waterway affording

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access to an increasingly popular recreational area and would permit more economical and efficient conduct of United States Coast Guard activities in the area. Because of the nature of these benefits, the district engineer is unable to assign a monetary value to them, but he is of the opinion that they would be sufficient to justify the proposed plan. The district engineer accordingly recommends that the existing project for Ocean City Harbor and Inlet, and Sinepuxent Bay, Md., be modified to raise the north jetty to an elevation 9 feet above mean low water, to provide a channel 300 feet wide and 16 feet deep at project datum from the ocean through the inlet to the Isle of Wight Bay Channel, thence 200 feet wide and 16 feet deep to the project harbor, thence 14 feet deep in the project harbor, and to provide a channel 60 feet wide and 3 feet deep at project datum from South Point across Sinepuxent Bay to Assateague Island in the vicinity of North Beach Coast Guard Station, with a turning basin at each terminus, substantially as described in his report, at an estimated cost of $716,000, of which $708,000 is for construction by the Corps of Engineers and $8,000 is for navigation aids by the United States Coast Guard, with $17,800 annually for maintenance in addition to that now required, subject to the conditions that local interests furnish free of cost to the United States all additional rights-of-way and spoil-disposal areas required for the new work and subsequent maintenance, release the United States and its agents from all claims for damages incidental to the work of improvement, and continue to reserve for public use the land at the South Point and Assateague Island termini of the Assateague Island channel now held by the Worcester County Commissioners. The division engineer concurs, subject to determination by model study of changes to be made to the inlet jetties and channel at Ocean City.

6. The Beach Erosion Board has reviewed the reports of the district and division engineers particularly with respect to the effect of the proposed improvements on shore-line changes. That Board concurs in the opinion of the district engineer that the proposed rebuilding and raising of the north jetty would have a beneficial effect on the shore line north of the inlet. It believes that recession of the shore line south of the inlet will continue, and temporarily may be aggravated somewhat by raising the north jetty. Therefore, it concurs in the district engineer's proposal to deposit dredged material on the beach south of the inlet to reduce erosion of the shore to the south.

7. The Board of Engineers for Rivers and Harbors has reviewed the reports of the district and division engineers and the additional information presented by local interests at a hearing before the Board. The Board concurs with the reporting officers, except as to the need for model study and the advisability of the United States undertaking improvement of the small-boat channel across Sinepuxent Bay. It recommends the proposed improvements at Ocean City subject to certain requirements of local cooperation.

8. After due consideration, I concur in the views and recommendations of the Board of Engineers for Rivers and Harbors. Therefore, I recommend that the existing project for Ocean City Harbor and Inlet, and Sinepuxent Bay, Md., be modified by raising the north jetty to an elevation 9 feet above mean low water, and by providing a channel 16 feet deep and 300 feet wide from the ocean through the inlet to the Isle of Wight Bay Channel, thence 200 feet wide to the

project harbor, and a depth of 14 feet in the project harbor, generally in accordance with the plan of the district engineer and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable, at an estimated cost to the United States of $658,000 for construction and $16,000 annually for maintenance in addition to that now required, provided that local interests agree to (*a*) furnish free of cost to the United States all lands, easements, rights-of-way, and suitable spoil-disposal areas for the new work and for subsequent maintenance when and as required; and (*b*) hold and save the United States free from damages due to the improvements; and provided further that, prior to construction, responsible local interests furnish assurances satisfactory to the Secretary of the Army that they will install and maintain adequate tank storage facilities at Ocean City for the handling of petroleum products. I further recommend that no improvement be made of the channel across Sinepuxent Bay to Assateague Island at Federal expense.

LEWIS A. PICK,
Major General, Chief of Engineers.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

[Second endorsement]

THE BOARD OF ENGINEERS FOR
RIVERS AND HARBORS,
Washington 25, D. C., June 20, 1950.

Subject: Ocean City Harbor and Inlet, and Sinepuxent Bay, Md.
To: The Chief of Engineers, United States Army.

1. Local interests were advised of the nature of the division engineer's report and afforded an opportunity to present additional information to the Board. At a hearing held by the Board, at their request, they generally were in favor of the improvements proposed at Ocean City. The only objection to the plan was expressed by one person who advocated realinement of the south jetty and certain other changes in the plan which he claimed would give better protection to the beach south of the inlet. After consideration of the reports of the district and division engineers and of the information presented by local interests at the hearing, the Board decided to concur with the reporting officers except for improvement of the ferry channel across Sinepuxent Bay. It believed that the general benefits were insufficient to justify the provision of the ferry channel at Federal expense. Local interests were so notified and were invited to submit information on the need and justification for the improvement wholly or partially at Federal expense. No communications have been received.

2. The Beach Erosion Board has reviewed the reports of the district and division engineers particularly with respect to the effect of the proposed improvements on adjacent shore lines. That Board concurs in the opinion of the district engineer that the proposed rebuilding and raising of the north jetty would have a beneficial effect on the shore line north of the inlet. It believes that recession of the shore line south of the inlet will continue, and temporarily may be aggravated somewhat by raising the north jetty. It therefore con-

curs in the district engineer's proposal to deposit dredged material on the beach south of the inlet to reduce erosion of the shore to the south.

3. The Board of Engineers for Rivers and Harbors believes that the present hazardous conditions at the inlet at Ocean City can be considerably improved by raising the north jetty and that this improvement combined with a wider and deeper channel through the inlet and increased depths in the harbor will afford benefits in excess of the costs. The Board believes that a model study is not necessary. A substantial portion of the anticipated benefits will result from savings in the transportation of petroleum products. In order that these benefits may be realized, it is obvious that suitable tank storage facilities, which are not now available at Ocean City, will have to be provided. Therefore, the Board is of the opinion that provision of the improvements should be contingent upon assurances by local interests that they will install and maintain such facilities.

4. The Board accordingly recommends that the existing project for Ocean City Harbor and Inlet, and Sinepuxent Bay, Md., be modified by raising the north jetty to an elevation 9 feet above mean low water, and by providing a channel 16 feet deep and 300 feet wide from the ocean through the inlet to the Isle of Wight Bay Channel, thence 200 feet wide to the project harbor, and a depth of 14 feet in the project harbor, generally in accordance with the plan of the district engineer and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable, at an estimated cost to the United States of $658,000 for construction and $16,000 annually for maintenance in addition to that now required, provided that local interests agree to (*a*) furnish free of cost to the United States all lands, easements, rights-of-way, and suitable spoil-disposal areas for the new work and for subsequent maintenance when and as required; and (*b*) hold and save the United States free from damages due to the improvements; and provided further that, prior to construction, responsible local interests furnish assurances satisfactory to the Secretary of the Army that they will install and maintain adequate tank storage facilities at Ocean City for the handling of petroleum products. The Board further recommends that no improvement be made of the channel across Sinepuxent Bay to Assateague Island at Federal expense.

For the Board:

J. S. BRAGDON,
Brigadier General,
Chairman.

REPORT OF THE DISTRICT ENGINEER

SYLLABUS

The district engineer finds that there is need for further improvement of the existing project for Ocean City Harbor and Inlet and Sinepuxent Bay, Md., that the prospective monetary benefits from such improvement are substantially in excess of the cost thereof, and that other important benefits would also accrue. He recommends that the existing project be modified to raise the north jetty to an elevation 9 feet above low water, to provide a channel 300 feet wide and 16 feet deep through the inlet, to provide a depth of 14 feet in the project harbor, and to provide a channel 60 feet wide by 4.7 feet deep at local low water across Sinepuxent Bay to the North Beach Coast Guard Station on Assateague Island, subject to certain conditions of local cooperation including that local interests provide the necessary rights-of-way and spoil-disposal areas.

CORPS OF ENGINEERS, UNITED STATES ARMY,
BALTIMORE DISTRICT,
Baltimore, Md., December 30, 1948.

Subject: Survey of Ocean City Harbor and Inlet and Sinepuxent Bay, Md.

To: The Chief of Engineers, United States Army, Washington, D. C.

1. *Authority.*—Section 6 of the River and Harbor Act approved March 2, 1945 (Public Law 14, 79th Cong.), contains the following item:

> The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys to be made at the following-named localities:
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> * * * * * * *
>
> Ocean City Harbor and Inlet and Sinepuxent Bay, Maryland.
>
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2. *Scope of survey.*—The preliminary examination was made as prescribed by law and was submitted by the district engineer on May 31, 1946. The Board of Engineers for Rivers and Harbors reviewed the report and, on September 10, 1946, recommended that a survey of Ocean City Harbor and Inlet and Sinepuxent Bay, Md., be made. A survey "to determine the cost of providing a suitable plan of improvement to meet the needs of local and general commerce and vessel traffic" was authorized by the Chief of Engineers in letter to the division engineer, Middle Atlantic Division, dated September 23, 1946, and the duty of making the survey was assigned to the district engineer on September 26, 1946.

3. Studies and field investigations undertaken for the report or reviewed in connection with it include surveys of the north jetty, the inlet, the project harbor, the channel from South Point across Sinepuxent Bay to Assateague Island in the vicinity of North Beach Coast Guard Station, and the shore line of the Atlantic Ocean for a distance of 10 miles north and 10 miles south of the inlet; observations of wind and wave action in the area and of tidal heights within the inlet and inner bays during the period of field surveys; a study of changes which have occurred within the inlet and inner bays and along the adjacent Atlantic Ocean shore line as depicted by previous surveys and aerial photographs; studies of previous float observations for determination of tidal velocities and direction of flow through the inlet; and a study of all available wind data.

4. A public hearing to determine the nature of improvements desired by local interests was held in connection with preparation of the preliminary examination report. During preparation of the survey report, the nature of navigation difficulties, desired improvements, and probable benefits from such improvements were discussed with county commissioners, officials of Ocean City, the senior officers at the Ocean City and the North Beach Coast Guard Stations, interests engaged in the distribution of petroleum products in the area, local sea-food packers, and boat operators.

5. *Description.*—Ocean City is located on the Maryland coast about 35 miles south of the entrance to Delaware Bay, about 105 miles north of the Virginia Capes, and is on a barrier beach between Sinepuxent Bay and the Atlantic Ocean. Sinepuxent Bay extends from Isle of Wight Bay on the north to Chincoteague Bay on the south, a distance of about 11 miles, and is from ½ to 1½ miles wide. On a number of

occasions in the past, storms have opened temporary inlets from the ocean to Sinepuxent Bay. A severe storm on August 25, 1933, opened such an inlet at the south end of the Ocean City Boardwalk. Improvement of this inlet which separates Ocean City from Assateague Island, a barrier beach extending 35 miles southward to Chincoteague, Va., forms a part of the existing project.

6. The mean range of ocean tide is 3.4 feet. The extreme range is from 3 feet below mean low water to about 3.5 feet above mean high water, a total of 9.9 feet. In the Isle of Wight Bay and Sinepuxent Bay the mean range of tide varies from approximately 2.5 feet at the inlet to 0.3 foot at their heads. The elevation of mean low water in the bays above mean low water in the ocean at Ocean City varies from about 0.8 foot in the vicinity of the inlet to 1.7 feet at their heads. Greater fluctuations are caused by prolonged high winds.

7. The controlling depths below the mean low water level of the ocean in the vicinity of the improvement are 10.0 feet in the inlet and in the project harbor; 4.6 feet in the Sinepuxent Bay channel; and 7.9 feet in the Isle of Wight Bay channel to Ninth Street, thence 4.5 feet to the end of the project in the bay. There are numerous wharves of pile and timber construction in the bay at Ocean City. In improving the inlet and to keep it open, jetties were constructed into the ocean on the north and south sides of the channel. The offshore end of the north jetty, which was constructed only slightly above mean high water, has settled and become flattened so that its outer end is now submerged.

8. Assateague Island Channel, which is not part of the Federal project, extends from near the lower end of Sinepuxent Neck, approximately 3,500 feet north of South Point, across Sinepuxent Bay, to Assateague Island in the vicinity of the North Beach Coast Guard Station. The mean range of tide in the vicinity is about 0.3 foot, and mean low water is approximately 1.7 feet above mean low water in the ocean at Ocean City. There is a timber bulkhead landing at each terminus of the channel.

9. The existing project, Assateague Island Channel, and all improvements considered in this report are in Worcester County, Md. The location is shown on United States Coast and Geodetic Survey Chart No. 1220, on Corps of Engineer Quadrangle Sheets, "Ocean City, Maryland," and "Tingles Island, Maryland," and on the accompanying maps.

10. *Tributary area.*—Ocean City, a resort town with a permanent population in 1940 of 1,050, and a transient population of more than 10,000, is served by improved roads and by the Baltimore, Chesapeake & Atlantic Railway, a branch of the New York, Philadelphia & Norfolk Line of the Pennsylvania Railroad, which has its terminus on the west side of the bay opposite Ocean City. The town of Berlin, with a population of 1,435 in 1940, is 7 miles inland from Ocean City. Berlin, in the same county and on the same railroad with Ocean City, is a small industrial center and a distribution point for commodities produced and used on the eastern side of the Delmarva Peninsula. The country adjacent to Ocean City and Berlin is principally agricultural.

11. *Bridges.*—A State highway bridge crosses the bay at Ocean City about 2,400 feet north of the inlet. This bridge has two bascule leaves and a clear horizontal opening of 70 feet. When closed, the

vertical clearance under the bridge is about 20 feet at low water in the bay. The plans for the bridge were approved by the Secretary of War on February 7, 1939, and a modification was approved June 12, 1940. A State highway bridge which extended across the bay about one-fourth mile south of the present bridge was removed by the Maryland State Roads Commission in 1948. There are no other bridges across the bay and no bridge alterations are involved in the improvements desired.

12. *Prior reports.*—The River and Harbor Act of August 2, 1882, authorized a preliminary examination of—

the Isle of Wight and Upper Sinepuxent Bays, Md., and Indian River, Del., with the intervening land, with a view to connect their waters.

The report was unfavorable to the proposition and is printed in Senate Executive Document No. 30, Forty-eighth Congress, first session.

13. Section 9 of the River and Harbor Act of July 5, 1884, authorized a preliminary examination and survey of—

Lewes Creek and Rehoboth Bay, Del., Assateague and Chincoteague Bays, Md., with a view to provide for continuous inland navigation from Chincoteague Bay, in Virginia, to Delaware Bay at or near Lewes, Del.

The report, which was favorable to improvement, is printed in House Executive Document No. 107, Forty-eighth Congress, second session. The project, providing for a channel 6 feet deep, 70 feet wide, and approximately 73 miles long from Chincoteague Bay to Delaware Bay at or near Lewes, Del., was initiated with funds provided for that purpose by the River and Harbor Act of August 11, 1888, and was repealed by section 7 of the River and Harbor Act of March 3, 1905, after approximately the northern third of the project was completed.

14. Section 3 of the River and Harbor Act of June 25, 1910, authorized a preliminary examination of Sinepuxent Bay. The improvement desired was a channel 5 feet deep, extending from the mouth of St. Martins River, a tributary of Isle of Wight Bay, southward through the shoals of Sinepuxent Bay, providing for local traffic only. The report was unfavorable to improvement and is printed in House Document No. 248, Sixty-third Congress, first session.

15. Section 6 of the River and Harbor Act of March 2, 1919, authorized a preliminary examination and survey of the—

Waterway from Chincoteague Bay, Va., to Delaware Bay at or near Lewes, Del., including consideration of the relative advantages and costs of using the Mispillion River as the northern entrance to the waterway rather than the Broadkill River.

The reports which were favorable to providing a channel 6 feet deep and 40 to 50 feet wide and additional improvement at the mouth of the Broadkill River to better insure a stable channel, subject to certain conditions of local cooperation, are printed in House Document No. 120, Sixty-seventh Congress, second session. No work was accomplished on the through waterway.

16. A review of the reports in House Document No. 128, Sixty-seventh Congress, second session, with a view to determining whether any modification of the recommendation made therein was advisable at that time, was called for by resolution, adopted February 8,

1926, by the Committee on Rivers and Harbors, House of Representatives. A report, unfavorable to any modification, was sent to the committee on January 3, 1930.

17. Section 4 of the River and Harbor Act of January 21, 1927, authorized a preliminary examination and survey of "Ocean City Harbor and Inlet, Md.," and of "Sinepuxent Bay, Md., from the inlet north to Ocean City." The reports were favorable to opening an inlet between the Atlantic Ocean and Sinepuxent Bay at a point about 5 miles south of Ocean City, protecting the inlet by jetties, and providing certain channels substantially the same as described hereinafter under the existing project. The reports are printed in House Committee Document No. 38, Seventy-second Congress, first session. Subsequent to the preparation of this report and prior to its approval by Congress, the storm of August 1933 opened an inlet at the south end of Ocean City. A review of the reports in House Committee Document No. 38, Seventy-second Congress, first session, was called for by a resolution of the Committee on Rivers and Harbors, House of Representatives, adopted June 3, 1935. The report modified the recommended improvement in certain respects and is printed in House Committee Document No. 60, Seventy-fourth Congress, first session, The reports contained in the two latter House committee documents form the basis for the existing project.

18. No prior reports considered a channel across Sinepuxent Bay to Assateague Island, Md.

19. *Existing Corps of Engineers project.*—The project, authorized by the River and Harbor Act of August 30, 1935, provides for the construction of a navigable inlet between the Atlantic Ocean and Sinepuxent Bay, with a depth of 10 feet and a width of 200 feet, protected by jetties; a channel 10 feet deep, 100 feet wide and 3,000 feet long from the inlet channel into the marsh area to form a harbor south of the railroad on the west side of Sinepuxent Bay, with two turning basins of the same depth; a channel 6 feet deep and 150 feet wide in Sinepuxent Bay from the inlet to Green Point, thence 100 feet wide to Chincoteague Bay; and a channel 6 feet deep and 125 feet wide from the inlet channel to a point opposite North Eighth Street in Ocean City, thence 75 feet wide into Isle of Wight Bay.

20. The Federal costs under the existing project to June 30, 1948, were $350,193.02 for new work, and $506,306.51 for maintenance, a total of $856,499.53. In addition, $500,000 was expended for new work under the Federal project from funds contributed by the State of Maryland. The latest (1935) approved estimate for annual cost of maintenance is $32,000.

21. *Local cooperation on existing and prior projects.*—The State of Maryland was required to contribute two-thirds of the first cost of improvement, but not to exceed $500,000; local interests were required to furnish, without cost to the United States, all rights-of-way and spoil-disposal areas necessary for the execution of the project, and a competent public agency was required to acquire and dedicate to public use a frontage of approximately 1,000 feet along the north side of the harbor channel and extending in width approximately 180 feet to the south boundary of the railroad right-of-way. Local interests have complied with these conditions.

22. *Other improvements.*—The County Commissioners of Worcester County have provided a channel 50 feet wide and 4 feet deep at local

mean low water from South Point across Sinepuxent Bay to Assateague Island in vicinity of North Beach Coast Guard Station. Dredging was completed in July 1947. The material for construction of timber bulkhead landings provided at each terminus of the channel was contributed locally. The total cost of the work excepting materials for construction of the terminals was $11,500 of which $10,500 was contributed by the county and $1,000 by local subscription.

23. *Terminal and transfer facilities.*—The facilities on the bay side of Ocean City include two storage basins, for pleasure and small commercial craft, and numerous privately owned pile and timber piers and bulkhead wharves. Facilities at the project harbor include a public landing about 1,000 feet long, several privately constructed bulkhead wharves open to the public for transaction of business with the owners, and a boat-repair yard with a marine railway capable of handling boats up to about 150 tons. The project harbor is served by the Baltimore, Chesapeake & Atlantic Railway, which has a spur line parallel to the harbor on the north side about 200 feet away. All the piers and wharves are accessible by highway. Adequate space is presently available for expansion of facilities as required.

24. Terminal facilities for the channel across Sinepuxent Bay to Assateague Island consist of a county-owned timber bulkhead landing at both the South Point and Assateague Island termini of the channel. Adequate space is available for expansion of these facilities.

25. *Improvement desired.*—At a public hearing held in connection with the preliminary examination report, local interests requested improvement of the existing channel in the inlet and harbor to provide a depth of 16 feet and a width of 300 feet through the inlet and to provide a depth of 16 feet in the existing project harbor, with protecting jetties well lighted and high enough to prevent sand and seas from sweeping over them. They also requested that a bulkhead be constructed along the bay shore from the west end of the present steel-sheet pile bulkhead on the north side of the inlet northward to connect with the bulkhead at the United States Coast Guard property; however, as later discussed, the latter facility would not be essential to a project for navigation and so was not considered as a part thereof. Subsequent to the public hearing, Worcester County requested that a channel which it had provided across Sinepuxent Bay, from the mainland to Assateague Island, be maintained as part of the Federal project.

26. Local interests state that the present inlet channel is very dangerous to navigate, particularly during periods of strong winds. They claim that during such periods, boatmen entering the inlet channel risk loss of, or damage to, their boats by being blown on the rocks of the south jetty. They cited an occasion in which a boat sustained $4,000 damage in this manner, and claim that many boat operators do not use the harbor at Ocean City because of this hazard. They claim that raising the north jetty to form a sea wall would greatly alleviate this condition.

27. Local interests claim that a channel of the present project dimensions will not accommodate all vessels desiring to use the harbor. They state that fishing grounds used by fishermen from Virginia and New Jersey ports are along the coast of Maryland in the vicinity of Ocean City, that the vessels fishing on these grounds have drafts up to 12 feet, and that it would be more economical for the fishermen to

dispose of their catch at Ocean City than to travel to their home ports. They claim that for a distance of 180 miles along the Atlantic Coast between Cape May, N. J., and Norfolk, Va., the only port which has adequate facilities for vessels of the fishing fleet is Lewes, Del. They state that this lack of ports is a serious handicap to the heavy coastal navigation and fishing that exists off this portion of the coast.

28. Local interests claim that the desired improvement would provide a harbor which would enable commercial fishermen to reduce sailing time between the fishing grounds and port, and would permit from one-third to one-half more time on the fishing grounds. They claim that about 40 boats from Norfolk and about 40 or 50 boats from New Jersey ports and New York Harbor work on the fishing grounds in the vicinity of Ocean City. They estimate that about 20 of the Norfolk boats would increase their production 40 percent by using the harbor at Ocean City if the desired improvements were provided, and they obtain the following estimates of benefits on that assumption. They claim that, at 5 cents per pound for fish at the wharf, a 40-percent increase in an average weekly production of 10,000 pounds per boat would result in a net gain of $208,000 annually. They also claim that, because of the shorter distance from the fishing grounds to port the quality of fish presently delivered would improve and bring an increase of about 25 percent in price, or about 1 cent per pound, and result in an additional gain of $104,000 annually. The total increase in benefits to owners of the boats from the Norfolk area is thus estimated by local interests to be $312,000 annually. They further estimate that the gain for the boats operating out of New Jersey ports and New York Harbor would be equal to the gain indicated above for boats from the Norfolk area, making a total estimated gain for commercial fishermen of $624,000 annually.

29. Local interests stated that a food-processing organization has expressed interest in establishing a modern fish-processing plant at Ocean City provided that the desired improvements are made. They estimated that the annual output of this plant would be about 20,000,000 pounds of edible fish, and that one-half of this amount will reach a totally new consumer market at a price of 40 cents per pound, or a net gain of $4,000,000. They also estimated that as a result of saving in transportation cost of nonedible portions of fish, elimination of spoilage, saving in handling costs at retail outlets, and processing of byproducts, such as fish meal, additional benefits amounting to about 10 percent of the retail value of the 20,000,000 pounds of fish, or $800,000 annually would accrue. Later discussion with local interests indicated there was considerable doubt as to whether the food-processing organization was still interested in establishing a fish-processing plant at Ocean City.

30. Local interests stated that there are deep-sea scallops and quahogs off the coast of Ocean City. They claimed that, with provision of local port facilities able to accommodate the larger boats and a processing plant to provide a market, dragging for these scallops and quahogs might develop, producing new income estimated at about $100,000 annually.

31. Local interests stated that a leading distributor at Berlin receives about 4,000,000 gallons of petroleum products per year, and that, at present, he must receive these products at Salisbury, Md., then truck them to Berlin and Ocean City. They state that if tankers

could come to Ocean City a saving of about one-half cent per gallon on about 4,000,000 gallons, or about $20,000, would be experienced annually. In 1948, because of increased consumption of fuel oil in the area, it was estimated that savings on at least 4,500,000 gallons of petroleum products would be experienced annually.

32. Local interests state that an adequate port at Ocean City would allow pleasure-craft operators traveling from Cape May to Norfolk to use the Atlantic Ocean route. They claim that these operators could travel from Cape May to Ocean City in 1 day and then from Ocean City to Norfolk the following day. They claim that at present, since the pleasure craft cannot get into Ocean City at all times, the operators use the route through Delaware Bay, Chesapeake & Delaware Canal, and Chesapeake Bay at a loss of 1 day of sailing time.

33. Local interests state that accomplishment of the improvement desired at Ocean City Harbor would provide a harbor of refuge to the many commercial and pleasure craft operating in the area. They state that in inclement weather fishing-boat operators lose valuable time from the fishing grounds by having to go to their home ports or to another harbor for refuge instead of a nearer port.

34. In requesting that the Federal Government take over maintenance of the channel which they have provided from South Point across Sinepuxent Bay to Assateague Island in vicinity of the North Beach Coast Guard Station, local interests state that this channel furnishes the only adequate public access to Assateague Island, making available to the general public a recreational area with such attractions as duck, fox, and deer hunting and surf fishing not available elsewhere in the general vicinity.

35. Local interests state that recreationists from Pennsylvania, New Jersey, Delaware, and Maryland, since provision of the channel, have been coming to Assateague Island in increasing numbers. They state that a lodge on the island furnishes meals and accommodations to visitors and that, in the past year, eight small cottages valued at an average of $1,200 each have been erected by individuals for their own use. They state that, in a 5-month period since provision of the channel, the automobile and passenger ferry operating from South Point to Assateague Island carried approximately 1,500 vehicles and 4,000 passengers to Assateague Island, and that they believe that the average yearly visitors to the area will be double this number.

36. Local interests state that they are not financially able to properly mark and maintain the present channel and that, unless this is done, recreationists and small pleasure-craft operators may soon again be denied adequate access to Assateague Island. They state that because the present channel is used by, and results in benefits to, the general public, its maintenance by the Federal Government is warranted.

37. Local interests offer to furnish, free of cost to the United States, all rights-of-way and spoil-disposal areas necessary for modification of the existing project at Ocean City and for maintenance of the Assateague Island channel.

38. *Commerce.*—The following tabulation shows the volume of water-borne commerce reported for Ocean City Harbor and Inlet and Sinepuxent Bay for the calendar years 1936 to 1946, inclusive:

Year	Tons	Passengers	Year	Tons	Passengers
1936	3,820	8,779	1942 [1]	3,370	3,399
1937 [1]	6,942	4,867	1943	2,534	452
1938 [1]	3,861	9,754	1944	3,328	6,558
1939 [1]	3,999	11,164	1945	2,130	3,871
1940 [1]	3,141	8,907	1946	1,781	1,547
1941	2,111	5,608			

[1] Does not include ferry traffic which amounted to 750 automobiles in 1937, 1,515 automobiles in 1938, 1,540 automobiles in 1939, 360 automobiles in 1940, and 800 automobiles in 1942.

39. The commerce reported for the calendar year 1946 consisted of 1,490 tons of fish, 126 tons of oysters, 116 tons of clams, and 49 tons of crabs.

40. The total prospective commerce claimed by local interests is highly speculative and largely dependent upon the provision of terminal facilities, plant, market, and other factors. However, provision of the desired improvement to permit use of the harbor by larger boats would be expected to increase the volume of sea-food products handled and to initiate the transportation of petroleum products by water to Ocean City.

41. Commerce over the channel across Sinepuxent Bay to Assateague Island has consisted of automobiles and passengers transported by the ferry (a reported 1,500 automobiles and 4,000 passengers during the 5-month period following completion of the channel in August 1947), an unknown quantity of crabs and clams caught along Assateague Island by small commercial sea-food boats, all provisions and supplies for maintenance of the North Beach Coast Guard Station, and much of the equipment of Navy personnel engaged in training exercises conducted on Assateague Island by the United States Naval Air Base at Chincoteague, Va.

42. *Vessel traffic.*—The following tabulation shows the reported trips and drafts of vessels using Ocean City Harbor and Inlet and Sinepuxent Bay during the calendar year 1946:

Draft	Motor vessels		
	In-bound	Out-bound	Total
7 feet	375		375
6 feet	540	255	795
5 feet	237	612	849
4 feet	1,161	173	1,334
3 feet	1,045	1,192	2,237
2 feet	914	2,040	2,954
Total	4,272	4,272	8,544
Total net registered tonnage	17,933	17,933	35,866

43. Vessel traffic through the Ocean City Inlet at the present time is almost entirely confined to local commercial fishing vessels, charter and open-party fishing vessels, and pleasure craft, all with drafts of 7 feet or less. Provision of the proposed improvement, making the harbor accessible to vessels up to 12 feet in draft, would attract many vessels to the area and greatly increase the present traffic. The indicated increase in vessel traffic would include regular trips to and from the offshore fishing grounds during the winter-fishing season by

20 or more fishing craft from ports north and south of Ocean City, regular trips throughout the year by self-propelled tankers transporting petroleum products into the area, an increased number of trips by local vessels engaged in commercial or sport-fishing trade, and trips by transient vessels seeking a harbor of refuge.

44. Vessel traffic over the channel across Sinepuxent Bay to Assateague Island has consisted of scheduled and special trips made by the ferry (approximately 600 round trips were made in the 5-month period following completion of the channel in August 1947), daily trips by the North Beach Coast Guard Station craft and an unknown number of trips by approximately 38 recreation and small sea food craft reported to be using the channel.

45. *Difficulties attending navigation.*—Difficulties attending navigation at Ocean City result in part from channel depths insufficient to permit entry of vessels desiring to use the harbor, making it necessary to travel considerable distances to other ports. In addition, depth beyond that needed for the normal draft of such vessels is required in the inlet, particularly when waves are high, to allow for the settling of craft in the trough of waves. Furthermore, proximity of the existing channel to the south jetty, strong currents through the inlet, and wave action create a definite hazard to navigation. With the north jetty low, boat operators fear that current, wind, and wave action will drive their vessels on the rocks of the south jetty.

46. The senior officer at the Ocean City Coast Guard Station has reported that calls from both local and transient vessels requesting to be guided through the inlet, particularly during periods of northeast storms, have been increasing. He stated that, during the past year, 25 vessels of various sizes were aided through the inlet and that many more stood off at Ocean City and finally harbored elsewhere. The dangerous navigation conditions in the inlet have resulted in the loss of two lives and the loss of two fishing craft valued at $12,500. These losses occurred when the vessels were blown against the south jetty and destroyed before aid could reach them. Greater losses have been prevented only because of prompt aid rendered by the United States Coast Guard and the fact that boat owners are generally aware of the existing dangerous conditions.

47. Difficulties encountered in using the channel across Sinepuxent Bay and Assateague Island at present result almost entirely from lack of navigation aids. However, if maintenance is not provided, lack of navigable depth in portions of the channel will become a greater difficulty.

48. *Water power and other special subjects.*—There are no questions of land reclamation, terminal facilities, waterpower, flood control, or other related subjects which could be coordinated with the proposed improvement in such a manner as to lessen the cost of the work to the United States.

49. *Plan of improvement.*—With a view to increasing the protection at the entrance of Ocean City Inlet and providing an inlet channel and project harbor of sufficient width and depth to accommodate the commercial and recreational craft desirous of using these facilities, consideration has been given to a plan to rebuild and raise the north jetty throughout its project length to a top elevation of 9 feet above mean low water with a top width of 20 feet, to provide a channel 300 feet wide and 16 feet deep at mean low water through the inlet from

the outer end of the jetties to the channel leading to the Isle of Wight Bay, and thence 200 feet wide and 16 feet deep at mean low water to the project harbor, and to provide a depth of 14 feet at mean low water in the project harbor.

50. To provide an adequate means of public access to the approximately 35-mile stretch of barrier beach lying south of Ocean City between the Ocean City Inlet and Chincoteague Inlet, consideration has been given to providing a channel 60 feet wide and 3 feet deep at mean low water, project datum, extending from South Point at the lower end of Sinepuxent Neck, approximately 10 miles south of Ocean City, across Sinepuxent Bay, to the barrier beach in the vicinity of the North Beach Coast Guard Station with an irregular-shaped turning basin at each end.

51. Rebuilding and raising the north jetty will provide a reasonably permanent structure serving a dual purpose. It will act as a breakwater for the protection of vessels navigating the inlet; and it will serve to create an impounding area of sufficient size to retain for a period of years the large quantity of littoral drift moving southerly along the Ocean City beach and now passing around and over the north jetty into the inlet and finally being deposited in the inlet and inner bays as shoals which are encroaching on or building into the project channels.

52. To be effective in each of these functions, it is considered that the top elevation of the jetty should be a minimum of 9 feet above mean low water. Experience at Ocean City has indicated that a jetty of lower elevation would no longer effectively arrest the southerly movement of littoral drift and would not adequately serve as a breakwater. In accordance with general practice, the top width would be 20 feet and the side slopes 2 vertical on 3 horizontal. The center line of the jetty would be shifted approximately 27 feet northerly of the center line of the existing jetty from a point about 500 feet from the boardwalk to the end of the jetty, and would converge to meet the center line of the existing jetty at a point about 350 feet from the boardwalk. By shifting the center line of the jetty a saving in the quantity of stone required would be effected and the stone of the existing jetty would serve as the toe on the inlet side of the reconstructed jetty. The existing stone is well stabilized and should resist displacement better than newly placed material.

53. Increasing the width of the channel through the inlet to 300 feet would permit vessels passing through the inlet to safely navigate the necessarily curved channel against swift tidal currents and frequent storm-strength northeasterly winds. Because of its curved alinement, proximity to the south jetty, and swift tidal currents, the present inlet channel is too narrow to permit safe navigation by fishing craft up to 110 feet in length and oil barges up to 200 feet in length.

54. The plan for a 16-foot-depth project channel through the inlet is based on providing a depth which would permit navigation of the inlet by commercial vessels with drafts of up to 12 feet, under all except extreme conditions of wind and tide. A channel depth which would provide for navigation only under favorable conditions of wind and tide would not permit commercial vessels to use the harbor regularly and hence could not be expected to develop full monetary benefits. As stated in paragraph 3, the ocean tide ranges to 3 feet below mean low water. Tides of below mean low water elevation have been recorded as often as 37 times in a 1-month period of tidal

observations. During periodic surveys of the inlet it has been found that wave heights of 2 to 3 feet are common with inshore winds. To assure adequate channel depths for navigation under such conditions, a depth of 3 feet–1.5 feet for below mean low water tides and 1.5 feet to allow for settling of vessels in the trough of waves, in addition to that of 13 feet otherwise needed for a 12-foot draft vessel, is required through the inlet. Since there is no appreciable wave action within the harbor and the range of tide is not as great as in the inlet, a depth of 14 feet there is considered adequate.

55. With a view to directing the ebb flow through the inlet away from the south jetty and in a direction more nearly parallel to the north jetty, some thought was given to a plan for dredging a channel from near the westerly end of the south jetty through a neck of land to intersect the Sinepuxent Bay Channel at a point approximately 1,800 feet south of the project harbor and to close off the present channel from the inlet to the project harbor. As the volume of flow from Sinepuxent Bay is only slightly less than that from Isle of Wight Bay, it is believed that by changing the angle at which the ebb flow from Sinepuxent Bay combines with the ebb flow from Isle of Wight Bay, a resultant flow through the inlet more nearly parallel to the north jetty would be obtained. Changing the direction of flow from Sinepuxent Bay, however, would change the hydraulics of the inlet and might result in a weakening of the barrier beach on the south side of the south jetty and also result in excessive shoaling in the inlet and in Sinepuxent Bay at the intersection with the new channel. Without the benefit of a model study, indicating definitely whether the above conditions would develop, it is considered inadvisable at this time to attempt to change the natural direction of ebb flow through the inlet. It is believed that widening of the inlet channel, providing adequate space in which to navigate, and raising the north jetty to form a breakwater affording protection against the predominant northeast storms, will largely eliminate existing dangerous navigation conditions about which local interests are concerned.

56. Local interests have requested that the Federal Government provide for the future maintenance of the channel across Sinepuxent Bay to Assateague Island. The present channel is 50 feet wide and 4 feet deep at local mean low water. These dimensions are too confined for the operation of dredging plant normally available. To economically maintain this channel it is considered that a width of 60 feet, and a depth of 3 feet below project datum, should be provided. This channel would provide a 4.7-foot depth at local low water, local low water being approximately 1.7 feet higher in this vicinity than project datum which is mean low water in the Atlantic Ocean.

57. The plans of improvement are shown on the accompanying drawings.

58. *Aids to navigation.*—An estimate by the district Coast Guard officer, Fifth Coast Guard District, in whose area the Ocean City Inlet and Assateague Island channels are located, indicates that the cost of furnishing and placing a suitable aid for proper marking of the north jetty at the inlet would be about $1,200 and that the cost of furnishing and placing suitable aids for marking the Assateague Island Channel would be about $5,900.

59. *Shore-line changes.*—A study of the probable effects of the proposed improvements at Ocean City on the adjacent Atlantic Ocean

shore line is included as an appendix [1] to this report. As indicated by this study, the proposed rebuilding and raising of the north jetty would have a generally beneficial effect on the shore line north of the inlet and would have a negligible effect, if any, on the shore line south of the inlet. The channel deepening and widening will have no effect on the ocean shore line.

60. The shore line under consideration lies along a low, sandy, natural barrier beach generally subject to active erosion except where preventive works have been provided, as at Ocean City. The littoral drift in the area is seasonal, moving northward during the summer months and southward during the winter months. The predominant drift is southward. It is estimated that an average of approximately 12,500 cubic yards of beach drifting material per month reaches the shore line north of the inlet.

61. The north jetty in its present condition has for all practical purposes reached the limit of its impounding capacity; thus the greater portion of the approximate average of 12,500 cubic yards of beach material per month reaching the north jetty is passing around or over the jetty, and a large portion is passing into the inlet channel and inner bays. Rebuilding and raising the north jetty will impound most of the southerly drifting material and result in an offshore growth of the beach to the north. How far north the protective influence will extend cannot be definitely determined, but it is believed that with maintenance of the jetty the beneficial influence would in time extend over the greater portion of the beach fronting the town of Ocean City. Erosion of the shore line south of the south jetty was taking place before the jetties were constructed and can be expected to continue.

62. Improvement and maintenance of the channel across Sinepuxent Bay to Assateague Island will not result in any changes to the shore line adjacent thereto.

63. *Estimate of first cost.*—The estimate of first cost of the plan of improvement considered in the report, based on current prices, including engineering, overhead and contingencies, is summarized below. All costs would be Federal.

(*a*) Ocean City Harbor and Inlet:	
Dredging: Channel 16 feet deep, 300 feet wide through the inlet to channel to Isle of Wight Bay, thence 16 feet deep and generally 200 feet wide to the project harbor, thence 14 feet deep in the project harbor; 208,000 cubic yards	$158,000
Construction—North Jetty: Raising north jetty to elevation of 9 feet above mean low water with top width of 20 feet, side slopes 2 on 3; 33,000 tons of stone [1]	500,000
U. S. Coast Guard for aids to navigation	2,000
Total estimated cost of plan for improvement of harbor and inlet	660,000
(*b*) Channel, South Point to North Beach Coast Guard Station:	
Dredging: Channel 3 feet deep, 60 feet wide, from South Point at the lower end of Sinepuxent Bay to the barrier beach in vicinity of the North Beach Coast Guard Station, 66,000 cubic yards	50,000
U. S. Coast Guard for aids to navigation	6,000
Total estimated cost of plan for improvement of channel	56,000
(*c*) Total estimated cost, entire plan of improvement	716,000

[1] Does not include an estimated 12,000 tons required for maintenance to restore present authorized project dimensions.

[1] Not printed.

64. *Estimates of annual charges.*—The estimated annual charges for the considered plan of improvement, all Federal, are as follows:

(*a*)	Ocean City Harbor and Inlet (total investment, $660,000):	
	Annual charges:	
	Interest on investment, at 3 percent	$19, 800
	Amortization of investment in 50 years	5, 800
	Estimated annual cost of maintenance in addition to present requirement	16, 000
	Total annual charges for plan of improvement for harbor and inlet	41, 600
(*b*)	Channel from South Point across Sinepuxent Bay to vicinity of North Beach Coast Guard Station (total investment, $56,000):	
	Annual charges:	
	Interest and amortization	2, 200
	Estimated annual cost of maintenance	1, 800
	Total annual charges for plan of improvement for channel	4, 000
(*c*)	Total annual charges for entire plan of improvement	45, 600

65. *Estimates of benefits.*—Improvement of navigation conditions in Ocean City Inlet and provision of adequate depths through the inlet to and in the harbor would provide to the many commercial trawler type sea food boats, which base at ports from northern Massachusetts to southern Virginia and operate over fishing grounds off Ocean City, a ready access to a market for their catch, a base for obtaining supplies, and a protected and convenient refuge during periods of storm. Although benefits from the proposed improvement would accrue in some degree throughout the year, the greater part would accrue during the winter months.

66. During the summer months, edible fish are found in fair abundance along the entire Atlantic coast, therefore, the trawlers during these months generally operate over fishing grounds close to their home ports. It is thus improbable that more than a few additional trawlers would be attracted to an improved harbor at Ocean City during the summer months. During the winter season, however, edible fish are usually found in greater abundance off Ocean City than off other points along the Middle Atlantic coast. Therefore, during this season a large number of trawlers operate off Ocean City and could be expected to make use of any adequate facilities provided at Ocean City.

67. An improved inlet and harbor at Ocean City would enable boats from southern ports, principally from Virginia, to dispose of their catch at a location having transportation costs, to northern retail outlets where winter-caught fish are sold, approximately three-fourths of a cent less than the transportation costs from their present home-port markets. For trawlers from northern ports, principally from Massachusetts, New York, and northern New Jersey, an improved harbor and inlet at Ocean City would reduce the running time from the fishing grounds to market and permit additional fishing time which would allow an increase of approximately 10 percent in the total catch. It is estimated that approximately 10 trawlers from southern ports and 10 trawlers from northern ports would take advantage of the appropriate foregoing savings. Based on a winter fishing season of 20 weeks and an average weekly catch of 10,000 pounds per boat, savings in transportation costs on the catch of ves-

sels from southern ports would provide monetary benefits of approximately $15,000; and, based on an average price of 7 cents a pound for fish, the increase in catch for vessels from northern ports would result in an addition to the Nation's food supply having an annual net value, at fishermen's level, of approximately $14,000. The combined estimated benefits from lower transportation cost and increased catch would be $29,000.

68. Provision of the considered improvements would, it is indicated, be followed by the construction of an oil and gasoline terminal at Ocean City from which these petroleum products could be distributed to the eastern side of the Delmarva Peninsula south of the Delaware State line to Chincoteague, Va., at an estimated average saving of almost one-half cent per gallon. At present there is no oil or gasoline terminal at Ocean City, and nearly all petroleum products consumed in this area are handled through Salisbury. The present project depths in the inlet and harbor are not sufficient to permit ocean type, self-propelled oil barges to enter Ocean City, and smaller tankers cannot be used economically because of prohibitive insurance rates on such vessels when used over an ocean route.

69. Based on sales records of a large petroleum distributor in the area, it is estimated that approximately 4,500,000 gallons of gasoline and fuel oil yearly would be delivered at Ocean City at an annual saving of approximately $21,600 per year to petroleum consumers and dealers throughout the east-central section of the Delmarva Peninsula.

70. Provision of the proposed improvement will greatly alleviate the danger of damage or destruction to vessels navigating the inlet, permit greater use to be made of existing facilities, and make available a safer harbor for the refuge of the many pleasure and small commercial sea-food craft operating in the vicinity or traveling the ocean route between Cape May and Norfolk. The above benefits would accrue to general commerce and, if their values could readily be determined, it is believed that they would prove to be substantial.

71. Certain additional benefits would accrue to the local commercial fishermen. Present project dimensions so limit the size of fishing craft that they cannot be safely operated during the mid-winter period when northeast storms predominate and, as a result, local residents engaged in the fishing industry are generally unemployed during this period. An improved harbor permitting use of larger vessels which could be operated year round in the fishing industry would provide local fishermen an opportunity for full employment.

72. Other prospective developments that might result from improvement of the inlet, such as the construction of a modern fish-processing plant and the growth of a scallop and quahog industry, with the attendant benefits previously anticipated by local interests, appear at this time to be very improbable. Individuals who earlier may have advocated such enterprises appear no longer to be interested, and no other individuals have indicated any interest.

73. Benefits of a different nature would accrue to the maintenance of a channel across Sinepuxent Bay to Assateague Island in the vicinity of North Beach Coast Guard Station. Maintenance of this channel would provide to the general public from the surrounding area and nearby States a dependable waterway to a recreational area adjacent to the ocean, offering opportunity for fishing, hunting,

swimming, and camping, and would permit more efficient and economical conduct of United States Coast Guard activities in the area. Ferry service between the county-owned terminals of this channel is established. There is no other route of public access to Assateague Island except at Ocean City Inlet and at a point approximately 11 miles south of North Beach Coast Guard Station. At neither of these other points, however, are there terminal facilities or ferry service for transporting the recreationists, who are largely nonboat owners arriving by automobile at the shore of Sinepuxent Bay. Because of the nature of the benefits that would accrue from maintenance of the Assateague Island Channel, it has not been found possible to add their values in monetary terms.

74. During the 5-month period immediately following completion of the present channel, recreationists spent a reported $6,000 for transportation (4,000 passengers at $0.75 each and 1,500 cars at $2 each) across Sinepuxent Bay to Assateague Island, in order to enjoy the recreational facilities available there, and over a period of a year it is estimated that they will spend an amount in excess of $10,000. The yearly expenditure of such a sum, not normally required to gain access to a recreational area, is believed to be an indication of the benefits which will accrue with provision of the proposed channel.

75. Benefits to the United States Coast Guard will accrue from several causes. The Coast Guard will be able to more easily and economically supply the North Beach Coast Guard Station. Previously, practically all supplies had to be ferried across the Ocean City Inlet and then transported over 10 miles of open beach to the station. They will be able to maintain navigation aids in Sinepuxent Bay from the North Beach station and more readily render aid to vessels in distress in upper Chincoteague Bay and lower Sinepuxent Bay. Previously, such maintenance and aid had to be performed by personnel from the Ocean City station, 10 miles distant. Since completion of the Assateague Channel, the North Beach station has rendered aid to six vessels in distress in Sinepuxent Bay, and, in two of these assists, loss of life would probably have resulted if it had been necessary for the aid to come from the Ocean City station.

76. *Comparison of benefits and costs.*—Provision of the plan of improvement for the Ocean City Harbor and Inlet, as described in paragraph 49, would require an estimated Federal expenditure of $660,000 for raising the north jetty and for dredging in the inlet and project harbor. Non-Federal expenditures would not be required. The estimated total annual carrying charges are $41,600, of which $16,000 is for maintenance in addition to that now required, and $25,600 is for interest and amortization. The annual savings to which a monetary value has been assigned are $50,600. The ratio of benefits to cost for this part of the plan is 1.22 to 1, without taking into consideration important benefits not given a monetary evaluation.

77. Provision of the plan for improving and maintaining the channel from South Point to Assateague Island, as described in paragraph 50, would require an estimated Federal expenditure of $56,000 for dredging. Additional non-Federal expenditures would not be required. The estimated total annual carrying charges are $4,000, of which $1,800 is for maintenance and $2,200 is for interest and amortization. As indicated hereinbefore, the benefits found to accrue from provision for maintenance of this channel are of such a

nature that they cannot be adequately expressed in monetary terms. It is believed, however, that the benefits to the general public for transportation and the benefits previously described as accruing to the United States Coast Guard and from rescue work, plus such benefits as would accrue to recreation and small sea-food boats in the area, are more than sufficient to justify the proposed plan.

78. *Proposed local cooperation.*—In the event that a modification of the Ocean City Harbor and Inlet and Sinepuxent Bay project is undertaken, local interests should be required to furnish free of cost to the United States all additional necessary rights-of-way and spoil-disposal areas for the execution of the proposed modifications and to release the United States and its agents from all claims for damages incidental to the work of improvement. The 1 acre of land now owned by the county commissioners at the South Point terminus and at the Assateague Island terminus of the channel from South Point to Assateague Island should be reserved for public use. It is believed that these conditions would be fulfilled. It is estimated that the cost of local cooperation will be entirely administrative.

79. *Allocation of costs.*—The estimated total initial costs of constructing the proposed modification of the existing project is $716,000, and the estimated annual cost for maintenance of the modification is $17,800, all of which would be Federal costs. All of the maintenance cost and $708,000 of the initial cost would be allocated to the Corps of Engineers for constructing and maintaining the modification, while $8,000 of the first cost would be allocated to the United States Coast Guard for provision of additional navigation aids. Allocation of initial cost between the features of the project is shown below:

To Corps of Engineers:	
For inlet and project harbor including jetty	$658,000
For channel to Assateague Island	50,000
Total	708,000
To U. S. Coast Guard:	
For navigation aid on north jetty	2,000
For navigation aids to Assateague Island	6,000
Total	8,000

80. *Coordination with other agencies.*—Except for a request to maintain the channel to Assateague Island, no official communication regarding the considered improvements has been received from Worcester County or the State of Maryland.

81. *Discussion.*—The initial provision of the Ocean City Harbor and Inlet and Sinepuxent Bay project had two main purposes: One was to introduce salt water into the inner bays in order to promote the growth of sea food therein. For this purpose the State of Maryland contributed $500,000 toward the first cost of the project. The other purpose was to provide a harbor of refuge and route of access between the Atlantic Ocean and Sinepuxent Bay for both pleasure craft and commercial sea-food craft. In its first purpose the present project has served very well as no difficulty has been experienced to date in maintaining a large inflow of salt water into the inner bays. In its second purpose, however, the present project has not succeeded as well. Many local pleasure and commercial sea-food craft use the

present facilities with all its restrictions only because they have no other choice if they are to operate in the area, while many transient craft hesitate or refrain entirely from making use of the present project. Navigation conditions through the inlet have become more difficult with (*a*) the gradual lowering of the outer end of the north jetty and the resultant loss of protection against northeast storms which it furnished, (*b*) the shoaling of large areas within the inlet by southerly littoral drift moving around and over the north jetty into the inlet, and (*c*) the continued southward shifting of the natural inlet channel until one section of it now lies adjacent to the south jetty. Reports from the United States Coast Guard Station at Ocean City indicate that requests for aid from both local and transient vessels desiring to pass through the Ocean City Inlet are yearly increasing in number. It is probable that continued existence of these adverse navigation conditions would result in a gradual decrease of benefits accruing from the existing project and in precluding potential benefits from developing.

82. Ocean City is advantageously located with respect to extensive and highly productive sea-food grounds and, in contrast with many other grounds along the Middle Atlantic coast where edible fish are found in abundance only during the summer season, edible fish are abundant off Ocean City throughout the year. As a result, a good number of the trawler-type commercial sea-food craft based at ports from northern Massachusetts to southern Virginia operate off Ocean City during the winter months. Largely because of available savings in transporting sea food from port to market and savings in sailing time which would result in greater production, the operators of a number of trawlers desire to use the port at Ocean City and would be able to use it if a safely navigable inlet were provided. Probable benefits to accrue to the fishing industry and consumers from adequate facilities at Ocean City have been estimated hereinbefore at approximately $29,000.

83. The claim by local interests, however, that benefits of $624,000 per year would accrue to the trawler fleet with provision of the requested improvements is considered excessive. As previously stated, adequate fishing grounds close to their home ports are available to the vessels of this fleet during the summer season, hence they would make little if any use of Ocean City during that period. Furthermore, the saving between sailing time from the Ocean City fishing grounds to Ocean City and sailing time from these fishing grounds to other available ports is believed insufficient to justify the estimate by local interests that this saving in travel time would result in increased production of as much as 40 percent. Discussion with fish packers indicated that it is also very unlikely that, because of being slightly fresher, fish delivered to them would be worth appreciably more than fish delivered to a more distant port.

84. With the increasing consumption of petroleum products, particularly fuel oil, along the Delmarva Peninsula there has been a growing need for additional terminal facilities for receipt of these products. One of the larger petroleum distributors on the peninsula who is now operating in the vicinity is among those interested in the proposition of constructing a terminal at Ocean City to which products could be delivered directly by barge from Marcus Hook or Philadelphia on the Delaware River. At present, practically all

petroleum products reaching the area are shipped by inland-waterway barges down the Chesapeake Bay to Salisbury, Md. Delivery by tank cars into the area has been found too expensive, and delivery to Ocean City in small tankers drawing 10 feet or less (the present project depth in the inlet and project harbor) is uneconomical because of the high insurance rates on such boats traveling in the ocean. Based on data presented hereinbefore, it is reasonable to assume that a channel and harbor permitting delivery of petroleum products to Ocean City in ocean-type oil barges would result in a saving of 4.8 mills per gallon on approximately 4,500,000 gallons per year for a yearly benefit of $21,600.

85. In addition to the foregoing yearly benefits, totaling $50,600, certain other benefits, important but not readily evaluated, would accrue with the provision of an inlet navigable with safety, an inlet-channel adequately wide and deep, and a deeper project harbor. As previously stated, local commercial fishermen have been restricted to the use of small boats in operating in the fishing industry because of existing project depths and, because such boats are not safe to operate in the ocean throughout the winter period, they are unable to fish during the greater portion of that period. Providing a greater depth in the inlet and project harbor would permit local fishermen to use larger boats and operate year-round in the fishing industry.

86. Another unevaluated benefit would result from availability of the proposed improvement as a harbor of refuge. From the mouth of Delaware Bay to Norfolk, a distance along the ocean of approximately 170 miles, there is now no suitable refuge for the many pleasure and commercial fishing craft traveling in the vicinity except at Chincoteague and, since the controlling depth into Chincoteague is only 7 feet at mean low water, it can be used by only the smaller and shallower draft vessels. Construction of the proposed improvements would provide at Ocean City a desirable harbor of refuge safely available to all pleasure and commercial sea food craft in this area.

87. Benefits accruing from maintenance of the channel to Assateague Island cannot be adequately expressed in monetary terms. Abounding in wild game and offering excellent camping, hunting, and surf fishing for sportsmen, that section of the barrier beach extending south of Ocean City is becoming increasingly popular as a recreational area. Initially used almost entirely by local residents, the area now attracts many recreationists from out of State, particularly from Pennsylvania, New York, New Jersey, and Delaware. The lack of an adequate route of approach from the mainland to Assateague Island, the increasing number of visitors to the area, and the fact that the majority of visitors are not boat owners led to the provision of the existing channel by Worcester County in 1947 and the initiation by local interests of a ferry service operating regularly over week ends and on an on-call basis during the week. Because of the limited funds available, the channel provided was the minimum for operation of the ferry and for the small pleasure and commercial sea food craft in the area. Thus, without maintenance, shoaling of the channel will, in a short period, curtail operation of the ferry and deny access to Assateague Island to most of the present visitors.

88. Of greater importance are the benefits which have accrued to the United States Coast Guard and to navigation in Sinepuxent and Chincoteague Bays since completion of the channel. The location of

the channel with one terminus at the North Beach Coast Guard Station has permitted this station to render prompt aid to vessels in distress in upper Chincoteague and lower Sinepuxent Bays, and has provided other important advantages described hereinbefore. Previously, with insufficient water along the bay side of Assateague Island, the North Beach Station was unable to aid vessels in distress in the bays but, in the short time that the Assateague Island Channel has existed, that station has been enabled to render aid to a number of vessels in distress in Sinepuxent Bay and, in some of these assists, loss of life would probably have resulted if it had been necessary for another station to render the assistance.

89. Although local interests have requested only that the Federal Government take over maintenance of the existing channel and provide necessary navigation aids, the problem of economically maintaining such a channel as discussed in paragraph 56 has led to consideration of a somewhat larger channel, 60 feet wide and 3 feet below project datum (approximately 4.7 feet deep at local mean low water). The provision of such a channel would assure continuation of the recreational and important service benefits previously described, and would further open the waters of Sinepuxent Bay to local commercial sea-food craft. It is believed that these benefits, which cannot readily or adequately be evaluated in monetary terms, are substantial and more than sufficient to justify the Federal expenditure of funds for the proposed improvement.

90. Local interests have requested that a bulkhead be constructed from the west end of the present steel-sheet pile bulkhead on the north side of the inlet, to extend in a northerly direction and connect with the bulkhead at the United States Coast Guard property. Although such a bulkhead would arrest erosion of the shore line between the inlet and the United States Coast Guard property, its provision is not considered to be in the interest of navigation. If desired, provision of such a structure should properly be undertaken by the local governments or other local interests.

91. *Conclusion.*—The district engineer finds that the ratio of benefits to annual charges for the plan of additional improvement for Ocean City Harbor and Inlet is 1.22 to 1 and concludes that further improvement of the Ocean City Inlet and project harbor is fully justified by the benefits which would accrue from its use by present and prospective traffic and commerce. He also finds that the provision of a suitable channel across Sinepuxent Bay from Smith Point to Assateague Island is justified by the benefits and convenience, not readily evaluable, that would accrue to general navigation.

92. *Recommendations.*—The district engineer recommends that the existing project for Ocean City Harbor and Inlet and Sinepuxent Bay, Md., be modified to raise the north jetty to an elevation 9 feet above mean low water, to provide a channel 300 feet wide and 16 feet deep at project datum from the ocean through the inlet to the Isle of Wight Bay channel, thence 200 feet wide and 16 feet deep to the project harbor, thence 14 feet deep in the project harbor, and to provide a channel 60 feet wide and 3 feet deep at project datum from South Point across Sinepuxent Bay to Assateague Island in vicinity of North Beach Coast Guard Station with a turning basin at each terminus, substantially as described herein and shown on accompanying maps, at an estimated cost of $716,000, of which $708,000 is for

construction by the Corps of Engineers and $8,000 is for navigation aids by the United States Coast Guard, with $17,800 annually for maintenance in addition to that now required, subject to the conditions that local interests furnish free of cost to the United States all additional rights-of-way and spoil-disposal areas required for the new work and subsequent maintenance, release the United States and its agents from all claims for damages incidental to the work of improvement, and continue to reserve for public use the land at the South Point and Assateague Island termini of the Assateague Island Channel now held by the Worcester County Commissioners.

A. C. WELLING,
Lieutenant Colonel, Corps of Engineers,
District Engineer.

[First endorsement]

OFFICE, DIVISION ENGINEER,
NORTH ATLANTIC DIVISION,
New York 3, N. Y., February 18, 1949.

Subject: Survey of Ocean City Harbor and Inlet and Sinepuxent Bay, Md.

To: The Chief of Engineers, United States Army, Washington 25, D. C.

I concur in the conclusion and recommendations of the district engineer that the existing project for Ocean City Harbor and Inlet and Sinepuxent Bay, Md., be modified, as contained in the report, subject to determination by model study of changes to be made to the inlet jetties and channel at Ocean City, Md.

G. J. NOLD,
Brigadier General, United States Army,
Division Engineer.

LIST OF ILLUSTRATIONS MADE IN CONNECTION WITH THE REPORT OF THE DISTRICT ENGINEER

(Not printed)

File 53, Map 191. Vicinity Map.
File 53, Map 192. Proposed Improvement—Commercial Fish Harbor and Inlet.
File 53, Map 193. Channel From South Point to North Beach Coast Guard Station.

LIST OF APPENDIXES MADE IN CONNECTION WITH THE REPORT OF THE DISTRICT ENGINEER

(Only pls. 1 and 6 of appendix A printed)

Appendix
A. Effect on the Adjacent Shore Line of Considered Navigation Improvements.
Illustrations:
Plate 1. Vicinity Map.
Plate 2. Changes in High-water Shore Line, 12- and 24-foot-depth Curves.
Plate 3. Changes in 6-, 18-, and 30-foot-depth Curves.
Plate 4. Velocity and Tide Curves.
Plate 5. Float Observations in Inlet.
Plate 6. Plan of Improvement.
B. Digest of Public Hearing.
C. Prospective Commerce and Savings.
D. Estimates of Cost of Plan of Improvement.

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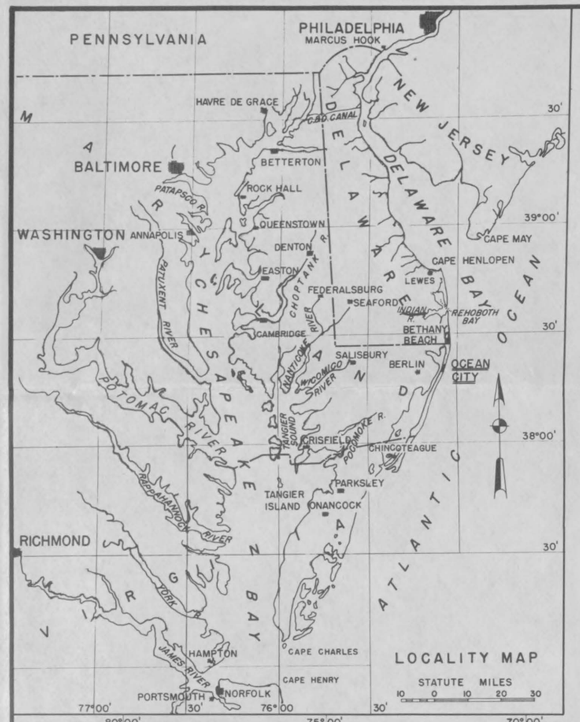
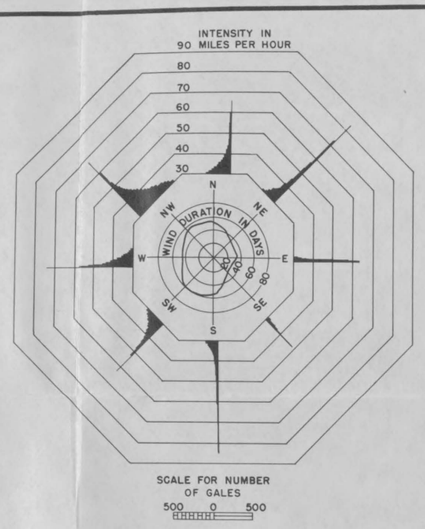
CORPS OF ENGINEERS

U. S. ARMY



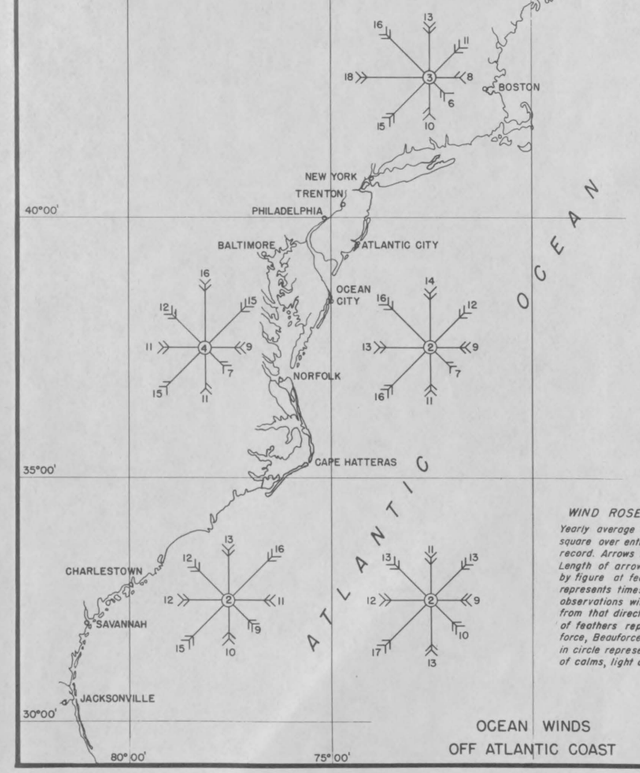


LEGEND

Data were obtained from U.S. Weather Bureau, Philadelphia, Pa. for period 1924-1941.
The intensity diagrams represent winds of gale force (30 M.P.H.) or greater, and are based on daily maximum 5 minute values.
The intensity of gales is indicated by length of line, and width along base shows, to the scale indicated, the number of days during the 18 year period having winds of a given intensity range.
The wind duration diagram indicates the average number of days per years for each direction, based on hourly wind records.

FREQUENCY BY DIRECTION OF WINDS OVER 30 M.P.H.								
	N	NE	E	SE	S	SW	W	NW
NUMBER OF GALES 30 M.P.H. OR GREATER YEARS 1924-1941 INCL.	338	237	74	47	162	295	240	648
FREQUENCY OF GALES 30 M.P.H. OR GREATER PER 100 YEARS	1876	1315	411	261	899	1637	1332	3576

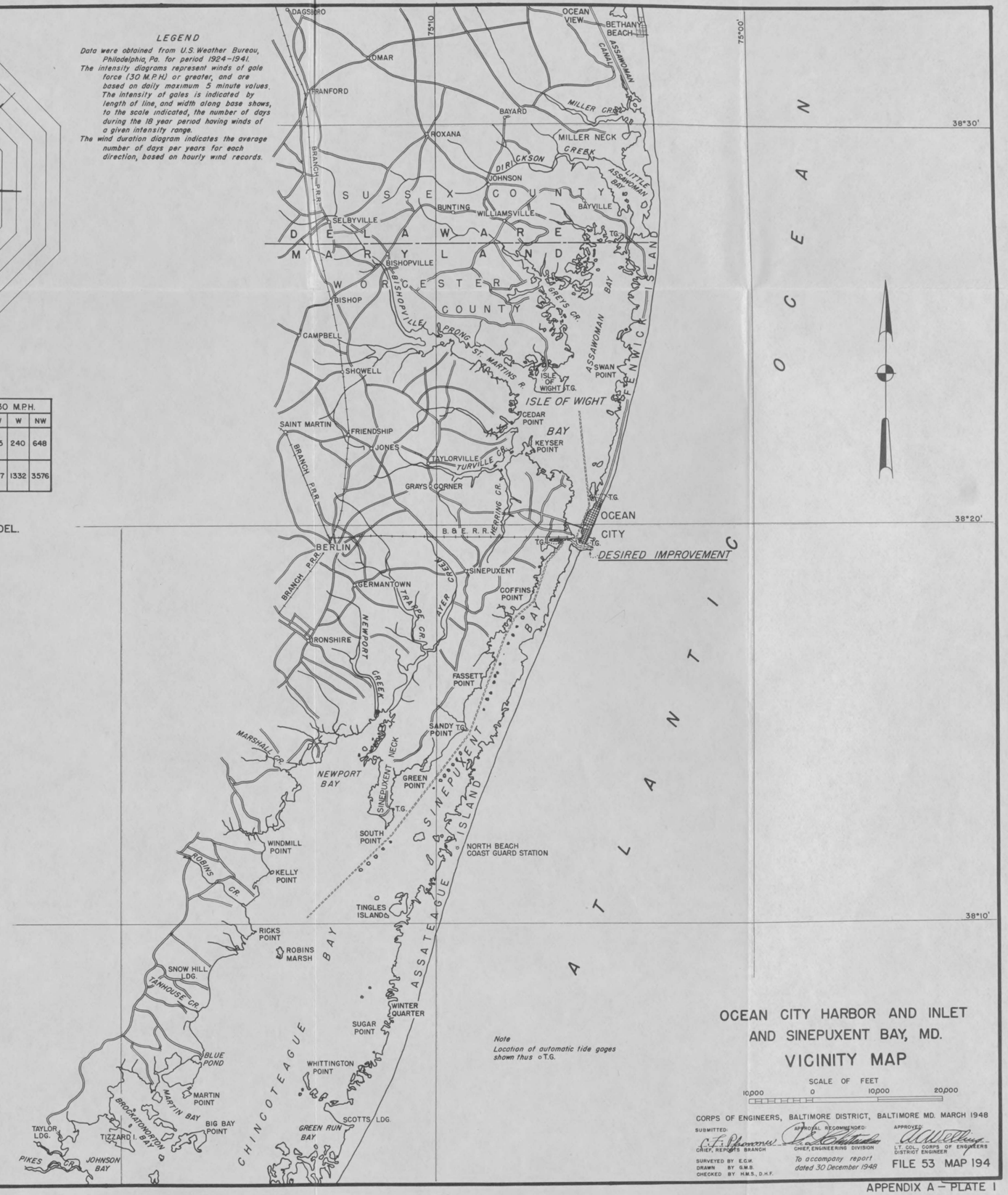
WIND DIAGRAM 1924-1941
DELAWARE BREAKWATER STATION, DEL.



WIND ROSES SHOW

Yearly average winds for 5° square over entire period of record. Arrows fly with wind. Length of arrow as indicated by figure at feather end represents times per 100 observations wind has blown from that direction. Number of feathers represents average force, Beaufort scale. Figure in circle represents precentage of calms, light airs and variables.

OCEAN WINDS
OFF ATLANTIC COAST



Note
Location of automatic tide goges shown thus ○T.G.

OCEAN CITY HARBOR AND INLET AND SINEPUXENT BAY, MD.

VICINITY MAP

SCALE OF FEET
10,000 0 10,000 20,000

CORPS OF ENGINEERS, BALTIMORE DISTRICT, BALTIMORE MD. MARCH 1948

SUBMITTED: CHIEF, REPORTS BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

SURVEYED BY E.G.W.
DRAWN BY G.M.B.
CHECKED BY H.M.S., D.H.F.

To accompany report dated 30 December 1948

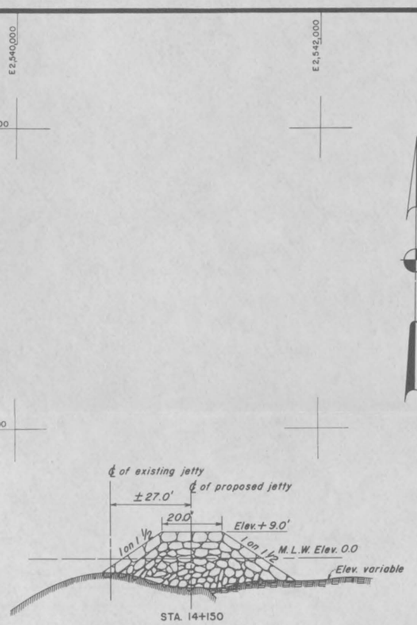
FILE 53 MAP 194

APPENDIX A — PLATE 1

98470 O - 52 (Inside back cover) No. 1

CORPS OF ENGINEERS

U. S. ARMY



STA. 14+150

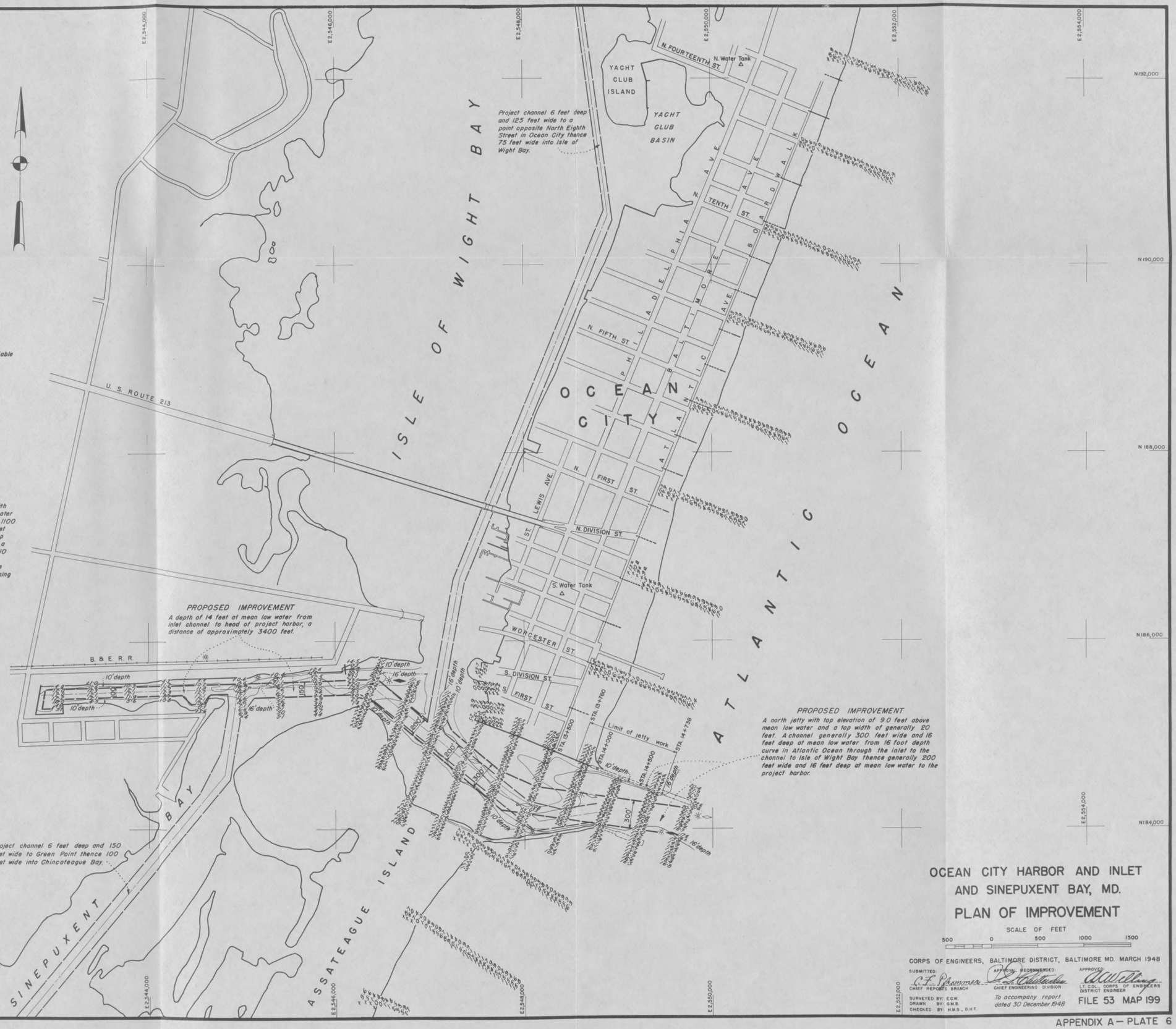
TYPICAL JETTY SECTION

HOR. SCALE 1"=20' VER. SCALE 1"=20'

Note:
Section of existing jetty
Hard sand bottom

EXISTING PROJECT

The existing project provides in part for an inlet channel with a width of 200 feet and a depth of 10 feet at mean low water protected by jetties (a north jetty extending approximately 1100 feet into the ocean and having a top elevation of +4.0 feet and a top width of 12.0 feet and a south jetty having a top elevation of +6.0 feet and a top width of 12.0 feet) and a channel with widths of 150 and 100 feet and a depth of 10 feet at mean low water extending from the inlet channel aproximately 3000 feet into the marsh area south of the railroad on the west side of Sinepuxent Bay with two turning basins of the same depths.



OCEAN CITY HARBOR AND INLET AND SINEPUXENT BAY, MD.

PLAN OF IMPROVEMENT

SCALE OF FEET

500 0 500 1000 1500

CORPS OF ENGINEERS, BALTIMORE DISTRICT, BALTIMORE MD. MARCH 1948

SUBMITTED: L. F. Pfommer, CHIEF REPORTS BRANCH

APPROVAL RECOMMENDED: CHIEF ENGINEERING DIVISION

APPROVED: LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

SURVEYED BY: E.C.W.
DRAWN BY: S.M.B.
CHECKED BY: H.M.S., D.H.F.

To accompany report dated 30 December 1948

FILE 53 MAP 199

APPENDIX A — PLATE 6

98470 O - 52 (Inside back cover) No. 2